mckenzie group

A Bureau Veritas Group Company

BUILDING CODE OF AUSTRALIA REPORT

Revision: March 2020

Tenancy T5 Change of Use
Chipmunks Tenancy

Mulgoa Road, Penrith, NSW

Prepared for: Home Consortium

Document Disclaimer

This document has been prepared solely for the use of our client in accordance with our current professional standards and as per our agreement for providing compliance consulting services. Although all due care has been taken in the preparation of this document, no warranty is given, nor liability accepted (except that required by law) in relation to the information contained within this document.

This document represents the opinions of McKenzie Group Consulting based on the facts and matters known at the time of preparation of this document. Opinions, judgments and recommendations detailed in this document, which are based on our understanding and interpretation of current statutory and regulatory obligations and standards, should not be construed as legal opinions.

Table of Contents

Date	Rev No	No. of Pages	Issue or Description of Amendment	Assessed By	Approved By	Date Approved
06.03.20	A	26	Preliminary Assessment for Change of Use Development Application	Elie Ishac	Geoffrey Pearce	06.03.20
24.03.20	B	25	Updated to include stakeholder comments – For DA Submission	Elie Ishac	Geoffrey Pearce	24.03.20

Executive Summary

Development Overview

The proposed development is change of use for tenancy T5 within an existing bulky goods premise, known as Home Consortium at Mulgoa Road, Penrith.

Our assessment is aimed at the assessing the use provisions and the impact on BCA compliance with the base building requirements. The fitout will need further assessment as part of the construction approval process.

Compliance Summary

As Accredited Certifiers, we have reviewed architectural design documents prepared by Hospitality Equipment 2020 Pty Ltd (refer appendix A) for compliance with the Building Code of Australia 2019

In this regard the following areas in particular require further review as the project develops:

No.	Items for review	Responsibility
1.	Please advise if there are any proposed alternative building solutions with regard to design of the building services for the project.	Services Consultants
2.	Fire Engineer is required to review the proposed change of use and fitout to determine it is consistent with the current fire engineering report.	Fire Engineer
3.	An indicative assessment of the BOH store & kitchen does not comply with access requirements of AS1428.1. The applicant proposes to request an exemption pursuant to the provisions of BCA Clause D3.4 which will need to be provided to the certifying authority.	Architect/Access

The following are the nominated BCA Departures assessed as performance based solutions under the existing building. The assessment of the design documentation has revealed that the following areas are required to be re-assessed against the relevant performance requirements of the BCA. The submission for Construction certificate will need to include verification from a suitably accredited fire engineer: -

No.	Alternative Solution Description	DTS Clause	Performance Requirement
Fire Safety Items			
1.	Perimeter Vehicular Access to be; a) Non continuous on the South-east side of the building in lieu of continuous in a forward direction b) Not less than 4.5m in width in localised areas not near corners of the building, in lieu of not less than 6m. That the change of use to a Class 9b does not affect the existing review of the building as a Class 6	C2.3 & C2.4	CP9
2.	UPS Battery Area is located in the building without the required fire separation in lieu of 120 minutes fire rating That the change of use to a Class 9b does not affect the existing review of the building as a Class 6	C2.12	CP6

3.	The exit travel distance from any point on a floor: a) to a point at which travel in different directions where two (2) exits are available is not more than: i. 30m within the retail area in lieu of 20m; and b) to the nearest exit, where two (2) exits are available, is not more than: a) 70m within the retail area in lieu of 40m As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid.	D1.4	DP4 & EP2.2
4.	The distance between alternative exits to be 100m in lieu of 60m As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid.	D1.5	DP4 & EP2.2
5.	The aggregate unobstructed egress width to be reduced to 17m in lieu of 29.5m The proposed change of use has not altered the original assessment and the departure remains as previously identified. As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid.	D1.6	DP4, DP6 & EP2.2
6.	Automatic sliding exit doors are opened via a push button device during after hours, in lieu of failsafe open on fire trip The proposed change of use has not altered the original assessment and the departure remains as previously identified. As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid.	D2.19	DP2
7.	Early Suppression Fast Response (ESFR)/Storage (i.e. RTI < 50m½s½) sprinkler heads to be retained throughout the building for protection of Ordinary Hazard risk in accordance with NFPA13 The proposed change of use has not altered the original assessment and the departure remains as previously identified. As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid.	E1.5	EP1.4
8.	Smoke hazard management to be provided throughout in accordance with NCC DTS Specification E2.2b with the following modifications: a) Rationalised smoke exhaust quantities to the building b) The building is to be treated as a single smoke reservoir (i.e. smoke baffles are not provided)	E2.2	EP2.2

	c) Smoke exhaust system initiated by fire sprinkler activation The proposed change of use has not altered the original assessment and the departure remains as previously identified. As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid.	
9.	It is proposed to maintain the existing standard of performance for all fire services in lieu of the change of use requirements of Clause 143 of the EP&A Regulations, that is: - - Automatic Detection & Alarm System - Building Occupant Warning System - Automatic Sprinkler System	E1.3, E1.5, E2.2

The fire engineered solution relating to CP9, EP1.4, EP2.2 will be subject to consultation with the NSW Fire Brigade as part of the Construction Certificate process under Clause 144 of the Environmental Planning & Assessment Regulation 2000.

The application for Construction Certificate shall be assessed under the relevant provisions of the Environmental Planning & Assessment Act 1979 (As Amended) and the Environmental Planning & Assessment Regulation 2000.

1.0 Introduction

The proposed development is change of use for tenancy T5 within an existing bulky goods premise, known as Home Consortium at Mulgoa Road, Penrith.

Our assessment is aimed at the assessing the use provisions and the impact on BCA compliance with the base building requirements. The fitout will need further assessment as part of the construction approval process.

This report is based upon the review of the design documentation listed in Appendix A of this Report

The report is intended as an overview of the relevant provisions of the Building Code of Australia for assistance only. Detailed drawings and associated review will still be required as the final design is developed.

1.1 Current Legislation

The applicable legislation governing the design of buildings is the Environmental Planning and Assessment Act 1979. This Act requires that all new building works must be designed to comply with the BCA.

The version of the BCA applicable to the development, is version that in place at the time of the application to the Certifying authority for the Construction Certificate. For the purposes of this Report, BCA 2016 Amendment 1 has been utilised as the version of the BCA applicable at the time of preparation this Report.

1.2 Upgrade to Existing Buildings

The local authority when assessing the development application may require that the existing building be brought into partial on full compliance with the current provisions at the BCA. The trigger for upgrade includes:

- Where the building works, together with any other works completed or authorised within the previous 3 years, represents more than half the total volume of the building; or

- Council are not satisfied the measures contained in the building are not adequate for the safety of present using the building or prevention of special to adjacent buildings.

Clause 143 of the EP&A Regulations requires the fire protection and structural adequacy of the building will be appropriate to its new use and the building will comply with such of the Category 1 fire safety provisions as are applicable to the new use. As such it is proposed to maintain the standard of performance for the relevant Category 1 fire safety measures as installed within the existing building through a performance based solution by an accredited fire engineer.

Notwithstanding the above, where practical benefits and improvements to fire and life safety can be achieved without major cost or disruption, it is recommended that the relevant compliance parameters be upgraded to meet current requirements where possible.

2.0 PRELIMINARIES

2.1 Building Assessment Data

Summary of Construction Determination: -

Part of Project	Existing Building Characteristics
Classification	6 & 9b
Number of Storeys	1
Rise In Storeys	1
Type of Construction	Type C (Large Isolated Building)
Effective Height (m)	0 – Single Storey Building

Summary of the floor areas and relevant populations where applicable: -

Part of Project	BCA Classification	Approx. Floor Area (m^2)	Assumed Population
Tenancy 5 – Chipmunks	9b	863	288*

Notes:
1. The above populations have been based on the floor areas and calculations in accordance with Table D1.13 of the BCA.
2. The floor areas have been adjusted without ancillary areas such as sanitary facilities, corridors, shelving and or racking layouts in storage areas – area to determine population has been reduced by 30% of the tenancy area.
3. Client is required to confirm the population numbers proposed

2.2 Structural Provisions (BCA B1)

Any new structural works are to comply with the applicable requirements of AS/NZS 1170.1.

Glazing is to comply with AS1288, and AS2047.

Prior to the issue of the Construction Certificate structural certification is required to be provided, including determination of the importance level of the development.

This is to include assessment against the provisions of BCA Clause B1.6 – Construction of Buildings in Flood Areas

2.3 Development Approval

A Development Approval will be required from the Local Authority for the development. A copy of the Development Permit conditions and approved drawings will be required prior to the issuing of the Building Approval for that component of works.

The proposed development must not be inconsistent with the endorsed drawings and all relevant conditions will need to be satisfied and accurately reflect the construction issue drawings.

3.0 FIRE PROTECTION

3.1 Fire Compartmentation (BCA C1.1)

The BCA stipulates three levels of fire resistant construction, which is based upon the rise in storeys and classification of the building. Each of these types of construction has maximum floor area and volume limitations as per BCA Table C2.2.

Based upon the rise in storeys and use of the Building, the building is required to be Type C Construction in accordance with Table 5 of Specification C1.1 of the Building Code of Australia 2016 Amendment 1.

The maximum floor area and volume limitations of a fire compartment as nominated in the deemed to satisfy provisions are as follows:

Classification		Type of Construction		
		A	B	C
5, 9b or 9c aged care building	max floor area—	8 000 m^2	5 500 m^2	3 000 m^2
	max volume—	48 000 m^3	33 000 m^3	18 000 m^3
6, 7, 8 or 9a (except for patient care areas)	max floor area—	5 000 m^2	3 500 m^2	2 000 m^2
	max volume—	30 000 m^3	21 000 m^3	12 000 m^3

As the building exceeds the area / volume limitations of the BCA provisions, the building is then considered a large isolated building and the following provisions will apply:

- Automatic sprinkler protection to AS2118.1 and BCA specifications E1.5 throughout the development / smoke detection and alarm system in accordance with AS1670,
- Perimeter emergency vehicular access 6m wide located within 18m of the entire building perimeter,
- Smoke exhaust or smoke required throughout the development

3.5 Fire Resistance (BCA C1.1)

The building should be constructed generally in accordance with the relevant provisions of Specification C1.1 of the BCA applicable to Type C Construction, Please refer to Appendix B which outlines the required fire rating to be achieved by the development.

3.6 Fire Hazard Properties (BCA C1.10 and BCA C1.12)

The fire hazard properties of fixed surface linings and mechanical ductwork will also need to be addressed within the detailed documentation phase pursuant to specification C1.10 Building Code of Australia. The following requirements apply:

<u>Sprinkler Protected Areas</u>

a) Floor Coverings – Critical radiant Flux not less than (insert) kW/m2
b) Wall and Ceiling Linings – Material Group No. (insert)
c) Other Materials – Spread of Flame Index not exceeding (insert) and Smoke Developed Index not exceeding (insert)

<u>Non-Sprinkler Protected Areas</u>

a) Floor Coverings – Critical radiant Flux not less than (insert) a maximum smoke development rate of 750 percent-minutes

b) Wall and Ceiling Linings – Material Group No. (insert) and with a smoke growth rate index not more than 100, or an average specific extinction area less than 250m2/kg
c) Other Materials – Spread of Flame Index not exceeding 9 and Smoke Developed Index not exceeding 8 (if Spread of Flame if >5)

Rigid and flexible air handling ductwork must comply with AS4254 parts 1 & 2 2012.

Floor linings and floor coverings used in lift cars must have a critical radiant flux not less than 2.2, and wall and ceiling linings must be a Material Group No. 1 or 2.

It is recommended that once material selections are made, copies of the fire test certificates/reports be provided for review and approval.

4.0 EGRESS PROVISIONS

4.1 Provisions for Escape (BCA D1)

The egress provisions from the proposed building are provided by:

- External perimeter doorways

Other detailing issues that will need to be addressed include:

- Door Hardware
- Exit door operation

4.3 Exit Travel Distances (BCA D1.4)

The locations of the proposed exits would appear to indicate that the deemed to satisfy requirements in terms of travel distances, distances between alternative exits and egress widths would be satisfied.

The travel distances to exits should not exceed:

Class 5-9

- 20m to a single exit or point of choice and where two exits are provided, a maximum of 40m to one of those exits; and
- exits shall be located to not be more than 60m apart and not closer than 9m

The existing building has endorsed a fire engineering solution to address departures for egress travel distances from the DTS provisions nominated above.

The fitout has been assessed to not exceed the provisions within the existing fire engineering report.

4.4 Dimensions of Exits (BCA D1.6)

Minimum dimensions of 1000mm and 2000mm height to be provided within exits, with the paths of travel should provide a minimum width of 1000mm (note that all maintenance access, cat walks, etc may comply with AS1657 in which case a 600mm clear width is required).

The proposed fitout has not increased the population assessed under the existing building and will not increase the departures addressed under the fire engineering report.

Doorways are permitted to contain a clear opening width of the required width of the exit minus 250mm, with a height of 1980mm as part of egress requirements. Access for persons with disabilities however requires a clear doorway opening width of 850mm (i.e minimum 920 mm doors).

5.0 ACCESS FOR PEOPLE WITH DISABILITIES

5.1 General Building Access Requirements (BCA D3.1)

Access for people with disabilities shall be provided to and within the building in accordance with the requirements of Clause D3.2, D3.3 and D3.4 of the BCA 2016 Amendment 1. Parts of the building required to be accessible shall comply with the requirements of:-

- AS1428.1-2009 General Requirements for Access – New Building Work;
- AS1428.4-2009 Tactile Ground Surface Indicators
- AS2890.6-2009 Car Parking for People with Disabilities

Access by the proposed change of use has not impacted the level of compliance associated with the base building.

The fitout will need to be assessed further as part of its associated approval.

5.2 Provision for Access to Buildings

The BCA prescribes access to be provided to and within the building as follows:

- Via the principle public entry and at least 50% of all other entrances
- From designated car parking spaces for the use of occupants with a disability.
- From another accessible building connected by a pedestrian link.
- All areas used by the public.

In buildings over 500m2 in floor area, a non-accessible entrance must not be located more than 50m from an accessible entrance.

And where a pedestrian entry contains multiple doors, the following is required;

- Entrance containing not more than 3 doors, at least one of the door leaves must be accessible.
- Where an entrance contains more than 3 doors, not less than 50% of the door leaves must be accessible.

A door is considered to be accessible if it is automatic (open and closing) or is more than 850mm in clear opening width and contains the required door circulation space.

Access by the proposed change of use has not impacted the level of compliance associated with the base building.

The fitout will need to be assessed further as part of its associated approval

5.3 Provisions for Access within Buildings (BCA D3.3)

A building required to be accessible is required to be equipped with either a 1428.1 compliant lift or 1428.1 compliant ramp, (but the maximum vertical rise of a ramp must not exceed 3.6m).

An exemption to not provide either a lift or ramp exists for class 5, 6, 7b, or 8 buildings, where a building contains;

a) Less than 3 storeys; and
b) Floor area of each storey (excluding the entrance level) is not more than 200m2.

Within the building the following are required;

- Door circulation space as per AS1428.1 Clause 13.3 and as attached in appendix 1;
- Doorways must have a clear opening of 850mm;

- Passing spaces (1.8m wide passages) must be provided at maximum of 20m intervals
- Within 2.0m of end access ways/corridors, turning areas spaces are required to be provided.
- Carpet pile height of not more than 11mm to an adjacent surface
- Any glazed capable of being mistaken for a doorway or opening must be clearly marked (or contain chair rail, hand rail or transom as per AS 1288 requirements)

The design would generally comply with the prescriptive provisions of the BCA with additional ongoing review being undertaken as to door widths, circulation, etc. Further details are to be provided or access to these areas is to be assessed by an access consultant.

Access by the proposed change of use has not impacted the level of compliance associated with the base building.

The fitout will need to be assessed further as part of its associated approval

5.5 Tactile Indicators (BCA D3.8)

Tactile indicators are required to be provided to warn occupants of all stairs (except Fire Isolated stairs) and ramps regardless of public nature or private environment and where an overhead obstruction occurs less than 2.0m above the finished floor level.

Exemptions apply in aged care facilities to include a down button to handrails in lieu of tactile indicators.

5.9 Provisions for Accessible Sanitary Facilities (BCA F2.4)

Unisex Accessible Sanitary Facilities

An accessible unisex sanitary facility must be located so that it can be entered without crossing an area reserved for one sex only and provided in accordance with AS 1428.1-2009 and must contain a closet pan, washbasin, shelf or bench top and adequate means of disposal of sanitary towels and as per following.

Ambulant Facilities

At each bank of toilets where there is one or more toilets in addition to an accessible unisex sanitary compartment, a sanitary compartment suitable for a person with an ambulant disability in accordance with AS 1428.1-2009 must be provided for use by males and females.

Where male sanitary facilities are provided at a separate location to female sanitary facilities, accessible unisex sanitary facilities are only required at one of those locations.

An accessible unisex sanitary compartment or an accessible unisex shower need not be provided on a storey or level that is not provided with a passenger lift or ramp complying with AS1428.1-2009

5.10 Signage (BCA D3.6)

As part of the detailed design package, specifications will need to be developed indicating:

- Sanitary Facility Identification Signs (note that they are to comply with BCA Specification D3.6 and include the use of Braille, Tactile, etc and be placed on the wall on the latch side of the facility);
- Directional / Way Finding signs to the Lifts, Sanitary Facilities, etc;
- Hearing Augmentation System;
- Identify each door required by BCA Clause E4.5 to be provided with an exit sign, stating ‘EXIT’ and ‘Level” number

6.0 FIRE SERVICES AND EQUIPMENT

The following section of this report describes the essential fire safety measures and the minimum performance requirements of those measures. A draft essential fire safety schedule can be found in Appendix B.

6.1 Fire Hydrants (BCA E1.3)

A system of Fire Hydrants is required to be provided in accordance with BCA Clause E1.3 and AS2419.1-2005, please provide pressure and flow calculations for review.

Pressure and flow information will be required to confirm the required pressures and flow to the system, depending on the type of hydrant to be utilized;

- Feed hydrants (within 20m of hard stand for pumping appliance), 150 kPa
- Attack hydrant (within 50m of hard stand) 250 kPa
- Hydrants on a pump station, 700 kPa

The building is required to be provided with a booster assembly as part of the fire hydrant requirements. The booster is required to be located attached to the building at the main entry. If remote from the building, the booster is to be located at the main vehicle entry and within sight of the main entry of the building within 20m of a hardstand area.

6.2 Fire Hose Reels (BCA E1.4)

A Fire Hose Reel System is required to BCA Clause E1.4 and AS2441-2005

Fire hose reels are to be located within 4m of exits and provide coverage within the building based on a 36m hose length. Where required, additional fire hose reels shall be located internally as required to provide coverage.

6.3 Fire Extinguishers (BCA E1.6)

The provision of portable fire extinguishers is required to BCA Clause E1.6 and AS2444-2001 to provide coverage.

Table E.6 details when portable fire extinguishers are required:

Occupancy Class	Risk Class (as defined in AS 2444)
General provisions – Class 2 to 9 buildings (except within sole-occupancy units of a Class 9c building)	:over Class AE or E fire risks associated with emergency services :chboards. (Note 1) :over Class F fire risks involving cooking oils and fats in kitchens. cover Class B fire risks in locations where flammable liquids in ess of 50 litres are stored or used (not excluding that held in fuel ‹s of vehicles). :over Class A fire risks in normally occupied fire compartments less ı 500m^2 not provided with fire hose reels (excluding open deck ɔarks). :over Class A fire risks in classrooms and associated schools not ⁄ided with fire hose reels. cover Class A fire risks associated with Class 2 or 3 building or ›s 4 part of building.

Fire extinguishers are to be located in accordance with AS 2444, often collocated with fire hydrants and/or fire hose reels.

6.4 Automatic Sprinkler Protection (BCA E1.5)

Automatic sprinkler protection is required to Specification E1.5 and AS2118.1-2017 to the following areas:

- Throughout the entire building if it is classified as large isolated under BCA Clause C2.3;

An occupant warning system should be provided in accordance with BCA Specification E1.5.

The proposed change of use has not altered the original assessment and the departure remains as previously identified. As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid

6.5 Exit Signs and Emergency Lighting (BCA E4.2 and BCA E4.5)

Emergency Lighting and Exit Signs indicating exit location paths of travel to exits to be provided in accordance with AS2293.1-2005

6.8 Smoke Hazard Management (BCA E2.2)

Smoke hazard management shall be provided throughout the building by means of the following systems:

- Automatic Smoke Exhaust System activated by Automatic Smoke Detection & Alarm System in accordance with the requirements of BCA Spec E2.2a and AS1670.1-2015

A fire indicator panel is required as part of the detection system. This panel is to be located within 4m of the main entry and should be incorporated within the fire control room. Any variation to the prescriptive provisions will require the consent of the fire brigade and should form part of the fire safety engineering report to verify the performance requirements of the BCA.

The proposed change of use has not altered the original assessment and the departure remains as previously identified. As there has been a change of use from a Class 6 to Class 9b building, a review by the fire engineer that the existing fire engineered solution assumptions and assessment remains valid

6.10 Fire Precautions During Construction (BCA E1.9)

After the building has reached an effective height of 12m, the following fire services are required to be operational:

- Required fire hydrants and fire hose reels; and
- Booster connections installed.

Appendix A - Design Documentation

The following documentation was used in the assessment and preparation of this report: -

Drawing No.	Title	Date	Drawn By	Rev
A01	Retail Plan	13.12.19	HOSPITALITY EQUIPMENT 2020 Pty Ltd	A6
A02	Overall Layout	13.12.19	HOSPITALITY EQUIPMENT 2020 Pty Ltd	A6
A03	Kitchen & Toilet Layout	13.12.19	HOSPITALITY EQUIPMENT 2020 Pty Ltd	A6

Appendix D- Fire Resistance Levels

The table below represents the Fire resistance levels required in accordance with BCA 2016 Amendment 1:

Table 3 TYPE A CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building — FRL: (in minutes) *Structural adequacy/Integrity/Insulation*			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is—				
For *loadbearing* parts—				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 60	120/ 90/ 90	180/180/120	240/240/180
3 m or more	90/ 60/ 30	120/ 60/ 30	180/120/ 90	240/180/ 90
For non-*loadbearing* parts—				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 60	–/ 90/ 90	–/180/120	–/240/180
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS—				
Fire-resisting lift and stair *shafts*—				
Loadbearing	90/ 90/ 90	120/120/120	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	90/ 90/ 90	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Ventilating, pipe, garbage, and like *shafts* not used for the discharge of hot products of combustion—				
Loadbearing	90/ 90/ 90	120/ 90/ 90	180/120/120	240/120/120
Non-*loadbearing*	–/ 90/ 90	–/ 90/ 90	–/120/120	–/120/120
OTHER LOADBEARING INTERNAL WALLS, INTERNAL BEAMS, TRUSSES and COLUMNS—	90/–/–	120/–/–	180/–/–	240/–/–
FLOORS	90/ 90/ 90	120/120/120	180/180/180	240/240/240

ROOFS	90/ 60/ 30	120/ 60/ 30	180/ 60/ 30	240/ 90/ 60

Table 3.9 REQUIREMENTS FOR CARPARKS

Building element	FRL (not less than) Structural adequacy/Integrity/Insulation ESA/M (not greater than)
Wall	
(a) *external wall*	
(i) less than 3 m from a *fire-source feature* to which it is exposed:	
Loadbearing	60/60/60
Non-*loadbearing*	–/60/60
(ii) 3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b) *internal wall*	
(i) *loadbearing*, other than one supporting only the roof (not used for carparking)	60/–/–
(ii) supporting only the roof (not used for carparking)	–/–/–
(iii) non-*loadbearing*	–/–/–
(c) *fire wall*	
(i) from the direction used as a *carpark*	60/60/60
(ii) from the direction not used as a *carpark*	as *required* by Table 3
Column	
(a) supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b) steel column, other than one covered by (a) and one that does not support a part of a building that is not used as a *carpark*	60/–/– or 26 m^2/tonne
(c) any other column not covered by (a) or (b)	60/–/–
Beam	
(a) steel floor beam in continuous contact with a concrete floor slab	60/–/– or 30 m^2/tonne
(b) any other beam	60/–/–
Fire-resisting lift and stair shaft (within the *carpark* only)	60/60/60
Floor slab and vehicle ramp	60/60/60
Roof (not used for carparking)	–/–/–
Notes: 1. ESA/M means the ratio of exposed surface area to mass per unit length.	

2. Refer to Specification E1.5 for special requirements for a sprinkler system in a *carpark* complying with Table 3.9 and located within a multi-classified building.

Table 4 TYPE B CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation*			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is—				
For *loadbearing* parts—				
less than 1.5 m	90/ 90/ 90	120/120/120	180/180/180	240/240/240
1.5 to less than 3 m	90/ 60/ 30	120/ 90/ 60	180/120/ 90	240/180/120
3 to less than 9 m	90/ 30/ 30	120/ 30/ 30	180/ 90/ 60	240/ 90/ 60
9 to less than 18 m	90/ 30/–	120/ 30/–	180/ 60/–	240/ 60/–
18 m or more	–/–/–	–/–/–	–/–/–	–/–/–
For non-*loadbearing* parts—				
less than 1.5 m	–/ 90/ 90	–/120/120	–/180/180	–/240/240
1.5 to less than 3 m	–/ 60/ 30	–/ 90/ 60	–/120/ 90	–/180/120
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
less than 3 m	90/–/–	120/–/–	180/–/–	240/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90 / 90	120/120/120	180/180/180	240/240/240
INTERNAL WALLS—				
Fire-resisting lift and stair *shafts*—				
Loadbearing	90/ 90/ 90	120/120/120	180/120/120	240/120/120
Fire-resisting stair *shafts*				
Non-*loadbearing*	–/ 90/ 90	–/120/120	–/120/120	–/120/120
Bounding *public corridors*, public lobbies and the like—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—				
Loadbearing	60/ 60/ 60	120/–/–	180/–/–	240/–/–
Non-*loadbearing*	–/ 60/ 60	–/–/–	–/–/–	–/–/–
OTHER LOADBEARING INTERNAL WALLS and COLUMNS—	60/–/–	120/–/–	180/–/–	240/–/–
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

Table 4.2 REQUIREMENTS FOR CARPARKS

Building element			FRL (not less than) *Structural adequacy/Integrity/ Insulation* ESA/M (not greater than)
Wall			
(a)	*external wall*		
	(i)	less than 3 m from a *fire-source feature* to which it is exposed:	
		Loadbearing	60/60/60
		Non-*loadbearing*	–/60/60
	(ii)	3 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b)	*internal wall*		
	(i)	*loadbearing*, other than one supporting only the roof (not used for carparking)	60/–/–
	(ii)	supporting only the roof (not used for carparking)	–/–/–
	(iii)	non-*loadbearing*	–/–/–
(c)	*fire wall*		
	(i)	from the direction used as a *carpark*	60/60/60
	(ii)	from the direction not used as a *carpark*	as *required* by Table 4
Column			
(a)	supporting only the roof (not used for carparking) and 3 m or more from a *fire-source feature* to which it is exposed		–/–/–
(b)	steel column, other than one covered by (a)		60/–/– or 26 m^2/tonne
(c)	any other column not covered by (a) or (b)		60/–/–
Beam			
(a)	less than 3 m from a *fire-source feature*:		
	(i)	steel floor beam in continuous contact with a concrete floor slab	60/–/– or 30 m^2/tonne
	(ii)	any other beam	60/–/–
(b)	3 m or more from a *fire-source feature*		–/–/–
Lift shaft			–/–/–
Fire-resisting stair shaft (within the *carpark* only)			60/60/60
Roof, floor slab and vehicle ramp			–/–/–

Note: ESA/M means the ratio of exposed surface area to mass per unit length.

Table 5 TYPE C CONSTRUCTION: FRL OF BUILDING ELEMENTS

Building element	Class of building—FRL: (in minutes) *Structural adequacy/Integrity/Insulation*			
	2, 3 or 4 part	5, 7a or 9	6	7b or 8
EXTERNAL WALL (including any column and other building element incorporated within it) or other external building element, where the distance from any fire-source feature to which it is exposed is—				
Less than 1.5 m	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
1.5 to less than 3 m	–/–/–	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
EXTERNAL COLUMN not incorporated in an *external wall*, where the distance from any *fire-source feature* to which it is exposed is—				
Less than 1.5 m	90/–/–	90/–/–	90/–/–	90/–/–
1.5 to less than 3 m	–/–/–	60/–/–	60/–/–	60/–/–
3 m or more	–/–/–	–/–/–	–/–/–	–/–/–
COMMON WALLS and FIRE WALLS—	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90	90/ 90/ 90
INTERNAL WALLS-				
Bounding *public corridors*, public lobbies and the like—	60 / 60/ 60	–/–/–	–/–/–	–/–/–
Between or bounding *sole-occupancy units*—	60/ 60/ 60	–/–/–	–/–/–	–/–/–
Bounding a stair if *required* to be rated—	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60	60/ 60/ 60
ROOFS	–/–/–	–/–/–	–/–/–	–/–/–

Table 5.2 REQUIREMENTS FOR CARPARKS

Building element			FRL (not less than) *Structural adequacy/Integrity/ Insulation* ESA/M (not greater than)
Wall			
(a)	*external wall*		
	(i)	less than 1.5 m from a *fire-source feature* to which it is exposed:	
		Loadbearing	60/60/60
		Non-*loadbearing*	–/60/60
	(ii)	1.5 m or more from a *fire-source feature* to which it is exposed	–/–/–
(b)	*internal wall*		–/–/–
(c)	*fire wall*		
	(i)	from the direction used as a *carpark*	60/60/60
	(ii)	from the direction not used as a *carpark*	90/90/90
Column			
(a)	steel column less than 1.5 m from a *fire-source feature*		60/–/– or 26 m^2/tonne
(b)	any other column less than 1.5 m from a *fire-source feature*		60/–/–
(c)	any other column not covered by (a) or (b)		–/–/–
Beam			
(a)	less than 1.5 m from a *fire-source feature*		
	(i)	steel floor beam in continuous contact with a concrete floor slab	60/–/– or 30 m^2/tonne
	(ii)	any other beam	60/–/–
(b)	1.5 m or more from a *fire-source feature*		–/–/–
Roof, floor slab and vehicle ramp			–/–/–
Note: ESA/M means the ratio of exposed surface area to mass per unit length.			